

Claims

- [c1] 1. A controlled-release fluid delivery device having enhanced fluid delivery, comprising:
- a housing having a fluid reservoir therein for holding a fluid;
 - at least one opening in the housing for enabling fluid delivery out of the fluid reservoir and the housing;
 - means for delivering the fluid out of the fluid reservoir;
 - means for retaining the fluid, delivered out of the fluid reservoir, proximate an ambient environment; and
 - means for imparting motion to the retaining means to, in turn, enhance the delivery of the fluid to the ambient environment.
- [c2] 2. The delivery device according to Claim 1, wherein the means for delivering a fluid and the means for retaining the fluid are integrated.
- [c3] 3. The delivery device according to Claim 2, wherein the means for delivering the fluid and the means for retaining the fluid is selected from the group consisting of a

capillary tube, a plurality of capillary tubes, a wick, and a plurality of wicks.

- [c4] 4. The delivery device according to Claim 3, wherein the means for delivering the fluid and the means for retaining the fluid are in communication with the fluid within the fluid reservoir and are in communication with the ambient environment.
- [c5] 5. The delivery device of Claim 1, wherein the means for delivering the fluid is selected from the group consisting of a gas generating cell, a water generating cell, an electrochemical cell, gravity force, a wick, a plurality of wicks, a capillary tube, a plurality of capillary tubes, and combinations thereof.
- [c6] 6. The delivery device according to Claim 1, wherein the means for imparting motion is selected from the group consisting of a piezoelectric device, an electric motor, a vibrating motor, a sonic wave producing device, a gas producing cell, and combinations thereof.
- [c7] 7. The delivery device according to claim 6, wherein the means for imparting motion is integrated with the means for retaining the fluid.
- [c8] 8. The delivery device according to Claim 6, wherein the means for imparting motion comprises a vibrating mem-

ber configured in a three-dimensional shape having at least a portion capable of imparting vigorous motion to the means for retaining fluid.

- [c9] 9. The delivery device according to Claim 6, wherein the means for imparting motion comprises a vibrating member comprising a cylinder having a circumference adjacent to which the means for retaining the fluid is disposed.
- [c10] 10. The delivery device according to Claim 1, wherein the means for imparting motion comprises a hollow member defining an interior portion, the hollow member having at least a portion that is capable of vibrating, wherein the means for retaining the fluid is at least partially disposed within the interior portion of the hollow member.
- [c11] 11. The delivery device according to Claim 10, wherein the hollow member comprises a tube having at least one aperture therein, and the means for retaining the fluid is threaded through the tube so as to be surrounded thereby.
- [c12] 12. The delivery device according to Claim 1, wherein the means for delivering the fluid comprises at least one opening within the fluid reservoir positioned in a generally downward-facing direction, and the means for re-

taining the fluid comprises at least one porous member positioned proximate the at least one opening.

- [c13] 13. The delivery device according to Claim 12, wherein the at least one opening further includes means for controlling a rate of fluid flow therethrough.
- [c14] 14. The delivery device according to Claim 12, wherein the means for imparting motion comprises at least one motion element in communication with the porous member and selected from the group consisting of a piezoelectric device, an electric motor, a magnetic motor, a sonic wave generator, a gas generating cell, and combinations thereof.
- [c15] 15. The delivery device according to Claim 14, wherein the motion element is integrated into the porous member.
- [c16] 16. The delivery device according to Claim 14, wherein the motion element is disposed adjacent to the porous member.
- [c17] 17. The delivery device according to Claim 14, wherein the motion element comprises at least one surface adjacent the porous member that is capable of vibrating.
- [c18] 18. The delivery device according to Claim 1, wherein the

means for delivering the fluid comprises at least one opening within the fluid reservoir and a device that forces the fluid out of the fluid reservoir through the at least one opening, and the means for retaining the fluid comprises a porous member positioned proximate the at least one opening.

[c19] 19. The delivery device according to Claim 18, wherein the means for imparting motion to the means for retaining the fluid is selected from the group consisting of a piezoelectric device, an electric motor, a magnetic motor, a sonic wave generator, a gas generating cell, and combinations thereof.

[c20] 20. The delivery device according to Claim 19, wherein the means for delivering a fluid and the means for retaining the fluid are integrated.

[c21] 21. The delivery device according to Claim 18, wherein the means for imparting motion to the means for retaining the fluid comprises a motion element disposed adjacent the means for retaining the fluid.

[c22] 22. The delivery device according to Claim 18, wherein the means for imparting motion to the means for retaining the fluid comprises at least one surface disposed adjacent the means for retaining the fluid, wherein at least

a portion of the at least one surface being capable of movement.

[c23] 23. The delivery device according to Claim 18, wherein the means for imparting motion comprises a hollow member having an interior portion, at least a portion that is capable of vibrating, and at least one aperture therein, wherein the means for retaining the fluid is at least partially positioned within the interior portion of the hollow member.

[c24] 24. A controlled release fluid delivery device comprising:

- a housing having a fluid reservoir for holding a fluid;
- means for delivering the fluid out of the fluid reservoir; and
- means for vibrating the means for delivering the fluid.

[c25] 25. The delivery device of Claim 24, wherein the means for delivering the fluid is selected from the group consisting of a wick, a capillary tube, a sponge, a porous plug, a tube, and combinations thereof.

[c26] 26. The delivery device of Claim 24, wherein the means for imparting motion is selected from the group consisting of a piezoelectric device, an electric motor, a mag-

netic motor, a sonic wave generator, a gas generating cell, and combinations thereof.

[c27] 27. A method of increasing the emanation of a fluid to an ambient environment from a controlled-release fluid delivery device, the method comprising the steps of:

- delivering a fluid from a fluid reservoir contained within a housing out of at least one opening in the housing;
- retaining the delivered fluid in a retaining member proximate an ambient environment; and
- imparting motion to the retaining member to increase emanation of the fluid to the ambient environment.

[c28] 28. A method of increasing the delivery of a fluid from a controlled-release fluid delivery device, the method comprising the steps of:

- delivering a fluid from a fluid reservoir contained within a housing out of at least one opening in the housing;
- retaining the delivered fluid in a porous pad proximate an ambient environment; and
- imparting motion to the porous pad to increase the emanation of the fluid to the ambient environment.

[c29] 29. A controlled-release fluid delivery device having en-

hanced fluid delivery, comprising:

- a housing having a fluid reservoir therein for holding a fluid;
- at least one opening in the housing for enabling delivery of the fluid out of the fluid reservoir and the housing;
- a fluid delivery mechanism in communication with the fluid to facilitate delivery of the fluid out of the fluid reservoir;
- a fluid retainer disposed proximate an ambient environment and in communication with the fluid delivered out of the fluid reservoir to retain the fluid; and
- a motion mechanism in communication with the fluid retainer to impart motion thereto and thereby enhance the delivery of the fluid to the ambient environment.

[c30] 30. A controlled-release fluid delivery device comprising:

- a housing having a fluid reservoir therein for holding a fluid and at least one opening in the housing for enabling delivery of the fluid out of the fluid reservoir;
- a fluid retainer disposed proximate an ambient environment and in communication with the at least one opening, the fluid retainer retaining the fluid delivered out of the fluid reservoir; and

– a motion element in communication with the fluid retainer to impart motion thereto and thereby enhance the delivery of the fluid to the ambient environment.

[c31] 31. The fluid delivery device of Claim 30, wherein the motion element is a motor that imparts rotational motion to the fluid retainer.

[c32] 32. The fluid delivery device of Claim 31, wherein the fluid retainer has a blade-like shape.

[c33] 33. The fluid delivery device of Claim 31, wherein the fluid retainer is a coating on a blade in communication with the motor.